Cyclic, $f$-cyclic, and bicyclic decompositions of the complete graph into the 4-cycle with a pendant edge. (English summary)


Let $[a, b, c, d; e]$ denote the graph $H = C_4 \cup \{e\}$, i.e., $V(H) = \{a, b, c, d, e\}$ and $E(H) = \{(a, b), (b, c), (c, d), (a, d), (a, e)\}$, the 4-cycle with a pendant edge. An $H$-decomposition of $K_v$ exists if and only if $v \equiv 0, 1 \pmod{5}$, $v \geq 10$ [J.-C. Bermond et al., Ars Combin. 10 (1980), 211–254; MR0598914]. An automorphism of an $H$-decomposition is a permutation of the point set which fixes the block set. An automorphism is said to be cyclic if it consists of a single cycle, is said to be $f$-cyclic if it consists of $f$ fixed points and a single cycle, and is said to be bicyclic if it consists of two disjoint cycles. In the paper under review, the authors give nice proofs for the necessity and sufficiency for the existence of cyclic, $f$-cyclic, and bicyclic $H$-decompositions of $K_v$.

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